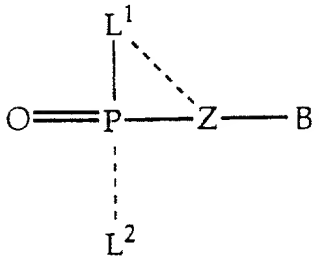
What is claimed is:

1. A compound of the formula I

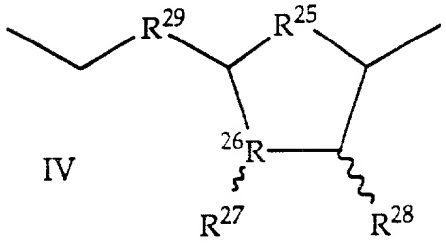


I

or a physiologically acceptable salt thereof, wherein

L^1 and L^2 are independently an amino acid or polypeptide residue bonded to the phosphorus atom of the compound by an amidate bond, or L^1 and L^2 are independently an oxyester, thioester, a substituted or unsubstituted amine, or hydroxy, provided that one or both of L^1 and L^2 is an amino acid or polypeptide residue and provided that any carboxyl group that is linked by less than 5 atoms to the amidate N is esterified or amidated and the dotted lines represent facultative bonds;

Z is $-CHR^7-R^{11}-(CH_2)_{m1}-C^{\#}(R^8)((CH^2)_{m2}(R^9))-(CH_2)_{m3}-R^{10}-(CH_2)_{m4}-$, $-Q-C_6H_4-CH_2-$, $-CHR^7-O-CHR^7-O-CHR^7-$, $-CHR^7-(CHR^{13})_{m1}-CHR^{14}-R^{10}-$,



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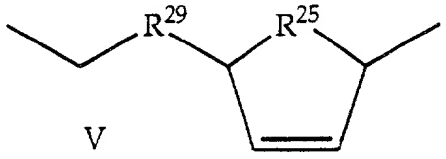

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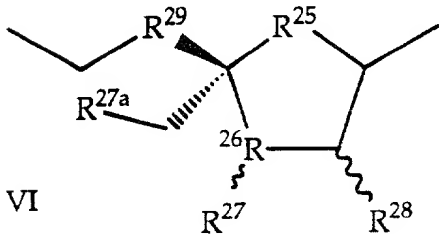

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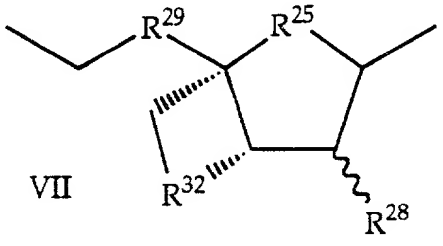

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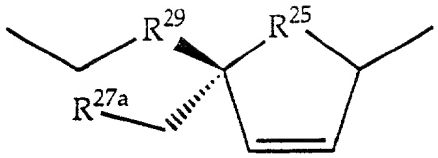


or VIII

R^7 is H or C_1-C_4 alkyl;

R^8 = R^7 or C_2-C_4 alkenyl, azidomethyl or azidoethyl;

R^9 is halogen (F, Cl, Br or I), H or OH;

R^{10} is O, CH_2 or a chemical bond;

R^{11} is O, S, CH_2, CHF, CF_2;

Q is $-C(R^{12})_2-CH_2-$, $-C(R^{12})_2-O-$, $-CR^{12}=CR^{12}-$, or $-C\equiv C-$, wherein each R^{12} is independently H, or halogen;

R^{13} is H, halogen, OH, CH_3, CH_2OH, or C_3-C_{12} acyloxymethyl;

R^{14} is independently H, halogen, OH, CH_3, CH_2OH, C_3-C_{12} acyloxymethyl, or C_2-C_{12} acyloxy;

R^{25} is CH_2, CHF or O;

R^{26} is CH or S, provided that when R^{25} is CH, R^{26} is not S;

R^{27} is H, OH, halogen, N_3, C_1-C_4 alkyl, C_1-C_4 alkoxy or when, R^{26} is S, R^{27} is absent;

R^{27a} is H, OH, halogen, N_3, C_1-C_4 alkyl, C_1-C_4 alkoxy;

R^{28} = R^{27a} and is independently chosen;

R^{29} is O, S, CH_2, CHF, CF_2;

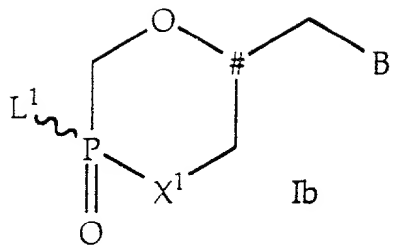
R^{32} is O;

m1 = m2 = m3 = m4 is an integer having a value from 0 to 4 wherein each is independently chosen;

the carbon atom designated $C^{\#}$ has linked substituents that are in the *R*, *S* or *RS* configuration; and

B is a heterocyclic base.

2. A compound of the formula Ib



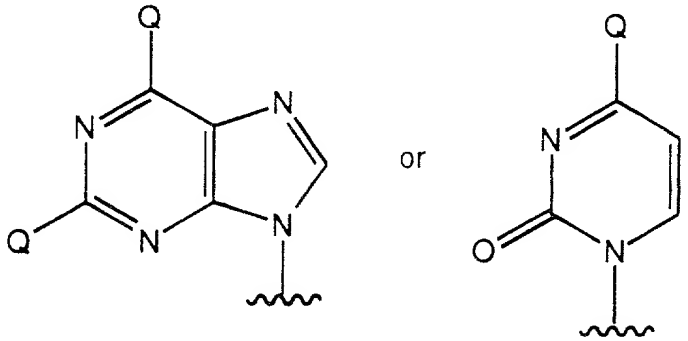
Ib

and stereoisomers and salts of such compounds wherein

X^1 is O or S;

L^1 is an amino acid, a polypeptide residue, a substituted or unsubstituted amine, an oxyester or a thio ester; and

the carbon atom designated # has linked substituents that are in the *R*, *S* or *RS* configuration, provided that L^1 is not a C_1-C_4 alkyl ester or, when when B is cytosin-1-yl, then L^1 is not $OCH_2C(O)NR^{5a}{}_2$, $OCH_2C(O)OR^{5a}$, $OCH_2OC(O)R^{5a}$, $OCH(R^{5a})OC(O)R^{5a}$ (R, S or RS stereochemistry), $OCH_2C(R^{5a})_2CH_2OH$, OCH_2OR^{5a}, OR^{5a}, NHR^{5a} or $NR^{5a}{}_2$ wherein R^{5a} is C_1-C_{20} alkyl, aryl or aryl-alkyl which may be substituted or unsubstituted by substituents independently selected from the group consisting of hydroxy and halogen, and provided that when X^1 is O and B is adenine, cytosine, guanine, thymine, uracil, 2,6-diamino purine, hypoxanthine, or Z^2; wherein Z^2 is



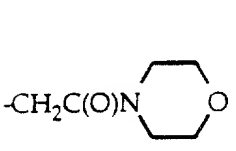
or

Q is independently chosen from H, Cl, NHR^X, $NR^X{}_2$, $NHC(O)R^X$, $N(C(O)R^X)_2$, OH or $NCHN(R^X)_2$, then L^1 is not OR^Y, NH_2, NHR^X, or $N(R^X)_2$ where R^Y represents a physiologically hydrolyzable ester group selected from the group consisting of $CH_2C(O)N(R^X)_2$, $CH_2C(O)OR^X$, $CH_2OC(O)R^X$, $CH(R^X)OC(O)R^X$, $CH_2C(R^X)_2CH_2OH$, or CH_2OR^X; R^Y may also be R^X provided that R^Y and R^X are not simultaneously alkyl;

R^X represents C_1-C_{20} alkyl, aryl or aryl-alkyl which may be substituted or unsubstituted by substituents independently selected from the group consisting of hydroxy, oxygen, nitrogen and halogen.

3. The compound of claim 2 wherein L^1 is NHR^{40} or OR^{31} wherein R^{40} is $C_{1\text{-}20}$ alkyl;

R^{31} is 2,3-dihydro-6-hydroxyindene; sesamol; catechol monoester; $-CH_2-C(O)-N(R^7)_2$ wherein each R^7 the same or different; $-CH_2-S(O)(R^7)$; $-CH_2-S(O)_2(R^7)$; $-O-CH_2-CH(OC(O)CH_2R^7)-CH_2(OC(O)CH_2R^7)$; cholesteryl; a monosaccharide; a disaccharide; an oligosaccharide (3 to 9 monosaccharide residues), enolpyruvate; glycerol; an α-D-β-diglyceride; trimethoxybenzyl; triethoxybenzyl; 2-alkyl pyridinyl ($C_{1\text{-}4}$ alkyl);



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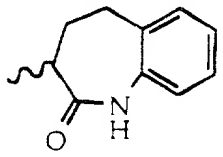

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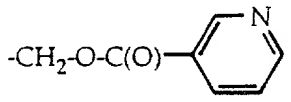

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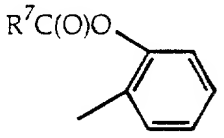
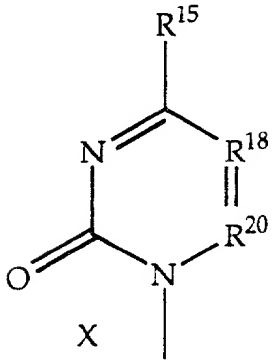


;

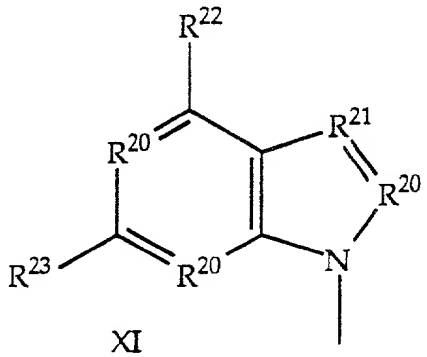
C_3-C_6 aryl substituted by 3, 4 or 5 halogen atoms or 1 or 2 atoms or groups selected from halogen, C_1-C_{12} alkoxy, cyano, nitro, OH, C_1-C_{12} haloalkyl, C_1-C_{12} alkyl, C_2-C_{12} alkenyl or C_2-C_{12} alkynyl; or

C_1-C_4 alkylene-C_3-C_6 aryl substituted in the aryl moiety by 3 to 5 halogen atoms or 1 to 2 atoms or groups selected from halogen, C_1-C_{12} alkoxy, cyano, nitro, OH, C_1-C_{12} haloalkyl, C_1-C_{12} alkyl, C_2-C_{12} alkenyl or C_2-C_{12} alkynyl.

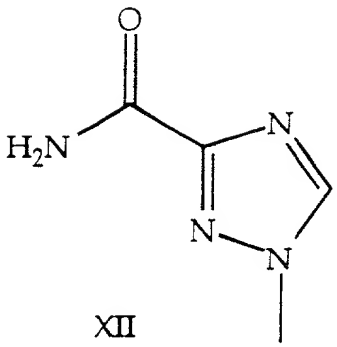
4. The compound of claim 3 wherein B is



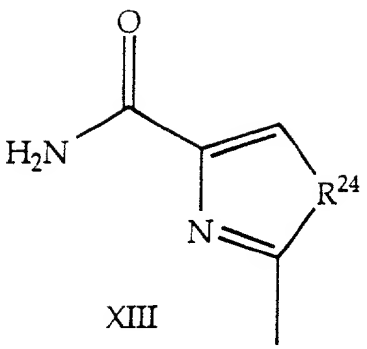
X



XI



XII



XIII

wherein R^{15} is H, OH, F, Cl, Br, I, OR^{16}, SH, SR^{16}, NH_2, or NHR^{17};

R^{16} is C_1 - C_6 alkyl

R^{17} is C_1 - C_6 alkyl;

R^{18} is N, CF, CCl, CBr, CI, CR^{19} or CSR^{19}, COR^{19};

R^{19} is H, C_1 - C_9 alkyl, C_2 - C_9 alkenyl, C_2 - C_9 alkynyl or C_7 - C_9 aryl-alkyl unsubstituted or substituted by OH, O, N, F, Cl, Br or I;

R^{20} is N or CH;

R^{21} is N, CH, CCN, CCF_3, CC≡CH or $CC(O)NH_2$;

R^{22} is H, OH, NH_2, SH, SCH_3, SCH_2CH_3, SCH_2CCH, SCH_2CHCH_2, SC_3H_7, $NH(CH_3)$, $N(CH_3)_2$, $NH(CH_2CH_3)$, $N(CH_2CH_3)_2$, $NH(CH_2CCH)$, $NH(CH_2CHCH_2)$, $NH(C_3H_7)$ or halogen;

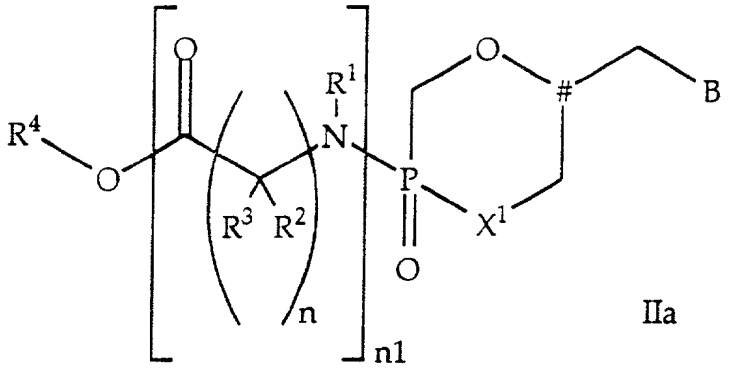
R^{23} is H, OH, F, Cl, Br, I, SCH_3, SCH_2CH_3, SCH_2CCH, SCH_2CHCH_2, SC_3H_7, OR^{16}, NH_2, or NHR^{17}; and

R^{24} is O, S or Se.

5. The compound of claim 4 wherein B is cytosin-1-yl, 6-azacytosin-1-yl, 5-fluorocytosin-1-yl, adenin-9-yl, guanin-9-yl or 2, 6-diaminopurin-9-yl.

6. The compound of claim 4 wherein R^{31} is 2-methoxyphenyl, 3-methoxyphenyl, 4-methoxyphenyl, 2-fluorophenyl, 3-fluorophenyl, 4-fluorophenyl, 2-ethoxy-5-hydroxyphenyl, 2-ethoxy-4-hydroxyphenyl 3,5-dimethoxyphenyl, 2,4-difluorophenyl, 2-(haloalkyl)-phenyl, 3-(haloalkyl)phenyl, 4-(haloalkyl)-phenyl, 2-cyanophenyl, 3-cyanophenyl, 4-cyanophenyl, 2-ethoxyphenyl, 3-ethoxyphenyl, 4-ethoxyphenyl, 2-carboethoxyphenyl, 3-carboethoxyphenyl, 4-carboethoxyphenyl, or 2-haloalkylbenzyl, 3-haloalkylbenzyl or 4-haloalkylbenzyl.

7. The compound of claim 2 of the formula IIa



IIa

wherein

n is 1, 2, 3, 4 or 5, wherein for n > 1, each -C(R^2)(R^3) is the same or different;

n1 is an integer;

R^1 is H or C_1-C_9 alkyl which is unsubstituted or substituted by substituents independently selected from the group consisting of OH, O, N, $COOR^4$ and halogen, C_3-C_6 aryl which is unsubstituted or substituted by substituents independently selected from the group consisting of OH, O, N, $COOR^4$ and halogen or C_3-C_9 aryl-alkyl which is unsubstituted or substituted by substituents independently selected from the group consisting of OH, O, N, $COOR^4$ and halogen;

R^2 = R^1 and is independently chosen;

R^3 is C(O)-OR^4, amino, C_1 - C_3 alkylamino, C_1 - C_3 alkyldiamino, C_1 - C_6 alkenylamino, hydroxy, thiol, C_1 - C_3 alkoxy, C_1 - C_3 alkthiol, $(CH_2)_nCOOR^4$, C_1-C_6 alkyl which is unsubstituted or substituted with OH, halogen, SH, NH_2, phenyl, hydroxyphenyl or C_7 - C_{10} alkoxyphenyl; C_2-C_6 alkenyl which is unsubstituted or substituted with OH, halogen, SH, NH_2, phenyl, hydroxyphenyl or C_7 - C_{10} alkoxyphenyl; C_6-C_{12} aryl which is unsubstituted or substituted with OH, halogen, SH, NH_2, phenyl, hydroxyphenyl or C_7 - C_{10} alkoxyphenyl; and

R^4 is H provided that n1 greater than 1, or is C_3-C_9 alkyl which is substituted by substituents independently selected from the group consisting of OH, O, N and halogen, C_3-C_6 aryl which is substituted by substituents independently selected from the group consisting of OH, O, N and halogen or

C_3-C_9 aryl-alkyl which is substituted by substituents independently selected from the group consisting of OH, O, N and halogen.

8. The compound of claim 7 wherein

n and n1 are 1;

R^1 is H, methyl, phenyl or benzyl;

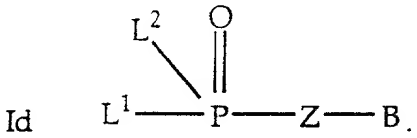
R^2 is H;

R^3 is H, $-CH_3$, $-CH(CH_3)_2$, $-CH_2-CH(CH_3)_2$, $-CHCH_3-CH_2-CH_3$, $-CH_2-C_6H_5$, $-CH_2CH_2-S-CH_3$, $-CH_2OH$, $-CH(OH)-CH_3$, $-CH_2-SH$, $-CH_2-C_6H_4OH$, $-CH_2-CO-NH_2$, $-CH_2-CH_2-CO-NH_2$, $-CH_2-COOH$, $-CH_2-CH_2-COOH$, $-(CH_2)_4-NH_2$, $-(CH_2)_3-NH-C(NH_2)-NH_2$, 1-guanidinoprop-3-yl, benzyl, 4-hydroxybenzyl, imidazol-4-yl, indol-3-yl, methoxyphenyl or ethoxyphenyl; and

R^4 is methyl, ethyl, propyl, isopropyl, butyl, t-butyl, phenyl, benzyl, 1-pyridyl, 3-pyridyl, 1-pyrimidinyl, pivaloyloxymethyl, N-ethylmorpholino, N-2-propylmorpholino, methoxyethyl, 4-N-methylpiperidyl, 3-N-methylpiperidyl, 2-, 3-, or 4-N,N-dimethylaminophenyl, 2-, 3-, or 4-N,N-diethylaminophenyl or 1-ethylpiperazinyl.

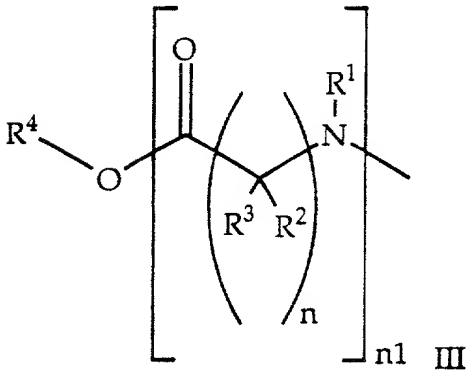
9. The compound of claim 8 wherein B is cytosin-1-yl, 6-azacytosin-1-yl, adenin-9-yl, guanin-9-yl or 2, 6-diaminopurin-9-yl, and X^1 is O.

10. The compound of claim 1 of the formula Id



Id

11. The compound of claim 10 wherein L^1 is of the formula III



III

wherein

n is 1, 2, 3, 4 or 5, wherein for n > 1, each $-C(R^2)(R^3)$ is the same or different;

n1 is an integer;

R^1 is H or C_1-C_9 alkyl which is unsubstituted or substituted by substituents independently selected from the group consisting of OH, O, N, $COOR^4$ and halogen, C_3-C_6 aryl which is unsubstituted or substituted by substituents independently selected from the group consisting of OH, O, N, $COOR^4$ and halogen or C_3-C_9 aryl-alkyl which is unsubstituted or substituted by substituents independently selected from the group consisting of OH, O, N, $COOR^4$ and halogen;

$R^2 = R^1$ and is independently chosen;

R^3 is $C(O)$-OR^4, amino, C_1 - C_3 alkylamino, C_1 - C_3 alkyldiamino, C_1 - C_6 alkenylamino, hydroxy, thiol, C_1 - C_3 alkoxy, C_1 - C_3 alkthiol, $(CH_2)_nCOOR^4$, C_1-C_6 alkyl which is unsubstituted or substituted with OH, halogen, SH, NH_2, phenyl, hydroxyphenyl or C_7 - C_{10} alkoxyphenyl; C_2-C_6 alkenyl which is unsubstituted or substituted with OH, halogen, SH, NH_2, phenyl, hydroxyphenyl or C_7 - C_{10} alkoxyphenyl; C_6-C_{12} aryl which is unsubstituted or substituted with OH, halogen, SH, NH_2, phenyl, hydroxyphenyl or C_7 - C_{10} alkoxyphenyl; and

R^4 is H provided that n1 greater than 1, or is C_3-C_9 alkyl which is substituted by substituents independently selected from the group consisting of OH, O, N and halogen, C_3-C_6 aryl which is substituted by substituents independently selected from the group consisting of OH, O, N and halogen or C_3-C_9 aryl-alkyl which is substituted by substituents independently selected from the group consisting of OH, O, N and halogen;

L^2 is OR, SR or is the same as L^1 wherein,

R is H,

C_3-C_{24} acyloxyalkyl,

C_6-C_{24} acyloxyarylalkyl,

C_3-C_{24} acyloxyalkoxyalkyl,

C_3-C_{24} acyloxyhaloalkyl,

C_1-C_{20} alkyl which is unsubstituted or substituted by substituents independently selected from the group consisting of OH, O, N and halogen (F, Cl, Br, I),

C_3-C_{20} aryl which is unsubstituted or substituted by substituents independently selected from the group consisting of C_1-C_6 alkyl, C_1-C_6 alkoxy, C_1-C_6 haloalkyl (1 to 3 halogen atoms), cyano, nitro, OH, O, N and halogen, or

C_4-C_{20} aryl-alkyl which is unsubstituted or substituted in the aryl moiety by substituents independently selected from the group consisting of C_1-C_6 alkyl, C_1-C_6 alkoxy, C_1-C_6 haloalkyl (1 to 3 halogen atoms), cyano, nitro, OH, O, N and halogen.

12. The compound of claim 11 wherein

n and n1 are 1;

R is N-ethylmorpholino, pivaloyloxymethyl, phenyl, benzyl, isopropyl, t-butyl, ethyl, isopropyl, butyl, adamantoyloxymethyl, 3-methoxyphenyl, 2-carboethoxyphenyl, 4-fluorophenyl, 2,4-difluorophenyl, 3,5-dimethoxyphenyl, 2,4-dichlorophenyl, 2-ethoxyphenyl, 3-dimethylaminophenyl, 4-trifluoromethylbenzyl, 2-ethylsalicyl, -O-CH_2-O-C(O)-$C_{10}H_{15}$, -C_6H_4-CH_2-$N(CH_3)_2$, -CH_2-CH_2F, -CH_2-CH_2Cl, -CH_2-CF_3, -CH_2-CCl_3, R^5, NHR^6 or $N(R^6)_2$

wherein,

R^5 is $CH_2C(O)N(R^6)_2$, $CH_2C(O)OR^6$, $CH_2OC(O)R^6$, $CH(R^6)OC(O)R^6$, $CH_2C(R^6)_2CH_2OH$, or CH_2OR^6, and

R^6 is C_1-C_{20} alkyl which is unsubstituted or substituted by substituents independently selected from the group consisting of OH, O, N and halogen (1 to 5 halogen atoms), C_6-C_{20} aryl which is unsubstituted or substituted by substituents independently selected from the group consisting of OH, O, N and halogen (1 to 5 halogen atoms) or C_7-C_{20} aryl-alkyl which is unsubstituted or substituted by substituents independently selected from the group consisting of OH, O, N and halogen (1 to 5 halogen atoms);

R^1 is H, methyl, ethyl, isopropyl, phenyl or benzyl;

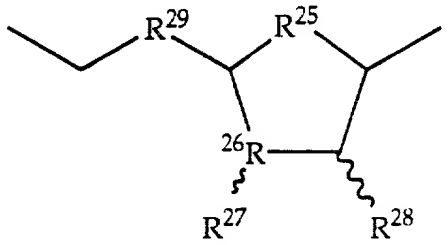
R^2 is H;

R^3 is H, -CH_3, -$CH(CH_3)_2$, -CH_2-$CH(CH_3)_2$, -$CHCH_3$-CH_2-CH_3, -CH_2-C_6H_5, -CH_2CH_2-S-CH_3, -CH_2OH, -CH(OH)-CH_3, -CH_2-SH, -CH_2-C_6H_4OH, -CH_2-CO-NH_2, -CH_2-CH_2-CO-NH_2, -CH_2-COOH, -CH_2-CH_2-COOH, -$(CH_2)_4$-NH_2, -$(CH_2)_3$-NH-C(NH_2)-NH_2, 1-guanidinoprop-3-yl, benzyl, 4-hydroxybenzyl, imidazol-4-yl, indol-3-yl, methoxyphenyl or ethoxyphenyl; and

R^4 is methyl, ethyl, propyl, isopropyl, butyl, t-butyl, phenyl, benzyl, 1-pyridyl, 3-pyridyl, 1-pyrimidinyl, pivaloyloxymethyl, N-ethylmorpholino, N-

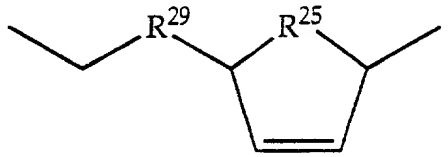
2-propylmorpholino, methoxyethyl, 4-N-methylpiperidyl, 3-N-methylpiperidyl, 2-, 3-, and 4-N,N-dimethylaminophenyl and 2-, 3-, and 4-N,N-diethylaminophenyl or 1-ethylpiperazinyl.

13. The compound of claim 12 wherein Z is $-CHR^7-R^{11}-(CH_2)_{m1}-C(R^8)((CH^2)_{m2}(R^9))-(CH_2)_{m3}-R^{10}-(CH_2)_{m4}-$,



IV

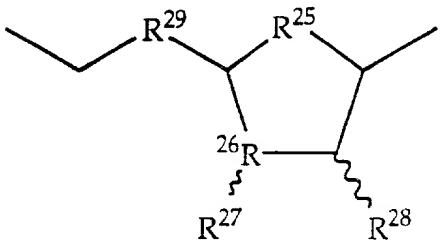
or



V .

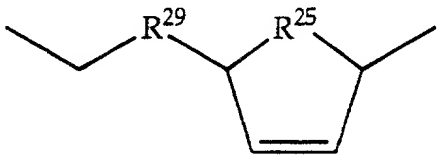
14. The compound of claim 13 wherein

Z is $-CH_2-O-CH_2-CH_2-$, $-CH_2-O-CH_2-CH(CH_2OH)-$, $-CH_2-O-CH_2-CH(CH_2F)-$, $-CH_2-O-CH_2-CH(CH_3)-$, $-CH_2-O-CH_2-CH(CH=CH_2)-$ or $-CH_2-O-CH_2-CH(CH_2N_3)-$, or is of formula IV or V



IV

or



V ;

wherein

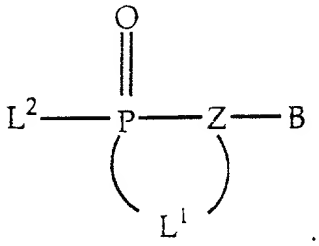
R^{25} and R^{29} are O;

R^{26} is CH;

R^{27} and R^{28} are H; and

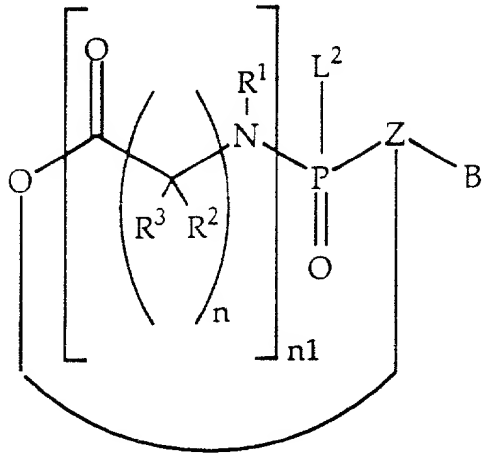
B is adenin-9-yl, 1-deazaadenin-9-yl, 3-deazaadenin-9-yl, 7-deaza-8-azaadenin-9-yl, 8-azaadenin-9-yl, guanin-9-yl, 2, 6-diaminopurin-9-yl, 2-aminopurin-9-yl, thymin-1-yl, cytosin-1-yl, 5-fluorocytosin-1-yl, 6-azacytosin-1-yl, 5-methylcytosin-1-yl, 5-bromovinyluracil-1-yl, 5-fluorouracil-1-yl or 5-trifluoromethyluracil-1-yl.

15. The compound of claim 1 of the formula Ic



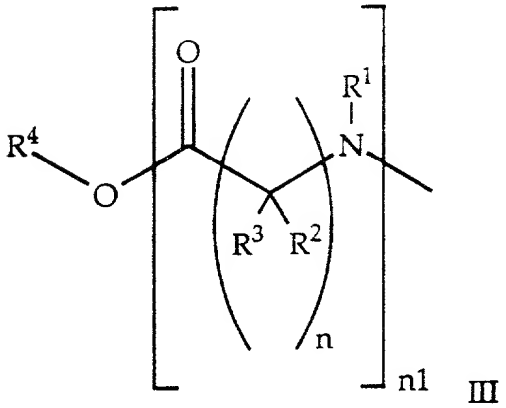
Ic

16. The compound of claim 15 of the formula IIc



IIc

wherein L^2 is OR, SR or



III

wherein

R is H,

C_3-C_{24} acyloxyalkyl,

C_6-C_{24} acyloxyarylalkyl,

C_3-C_{24} acyloxyalkoxyalkyl,

C_3-C_{24} acyloxyhaloalkyl,

C_1-C_{20} alkyl which is unsubstituted or substituted by substituents independently selected from the group consisting of OH, O, N and halogen (F, Cl, Br, I),

C_3-C_{20} aryl which is unsubstituted or substituted by substituents independently selected from the group consisting of C_1-C_6 alkyl, C_1-C_6 alkoxy, C_1-C_6 haloalkyl (1 to 3 halogen atoms), cyano, nitro, OH, O, N and halogen, or

C_4-C_{20} aryl-alkyl which is unsubstituted or substituted in the aryl moiety by substituents independently selected from the group consisting of C_1-C_6 alkyl, C_1-C_6 alkoxy, C_1-C_6 haloalkyl (1 to 3 halogen atoms), cyano, nitro, OH, O, N and halogen; and

R^1 is O-C_6H_4-CH_2-$N(CH_3)_2$, OR^5, NHR^6 or $N(R^6)_2$ wherein R^5 is $CH_2C(O)N(R^6)_2$, $CH_2C(O)OR^6$, $CH_2OC(O)R^6$, $CH(R^6)OC(O)R^6$, $CH_2C(R^6)_2CH_2OH$, or CH_2OR^6, and wherein R^6 is C_1-C_{20} alkyl, C_6-C_{20} aryl or C_7-C_{20} aryl-alkyl which is unsubstituted or substituted by substituents independently selected from the group consisting of OH, O, N and halogen.

17. A compound of the formula $(OR^{31})_2P(O)$-Z^1-B or $(OR)(OR^{31})P(O)$-Z^1-B, wherein;

B is a heterocyclic base;

Z^1 is selected from the group consisting of -CH_2-O-CH_2-CH_2-, -CH_2-O-C#H(CH_2OH)-CH_2-, -CH_2-O-C#H(CH_3)-CH_2-, -CH_2-O-C#H(CH_2F)-CH_2-, -CH_2-O-C#H($CH=CH_2$)-CH_2- and -CH_2-O-C#H(CH_2N_3)-CH_2-;

R is H,

C_3-C_{24} 1-acyloxy-1-alkyl,

C_6-C_{24} 1-acyloxy-1-aryl-1-alkyl,

C_3-C_{24} 1-acyloxy-2-alkoxy-1-alkyl,

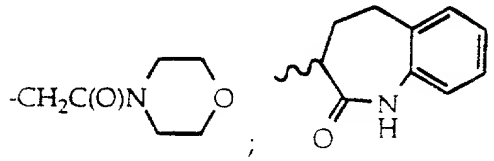
C_3-C_{24} 1-acyloxy-2-halo-1-alkyl,

C_1-C_{20} alkyl which is unsubstituted or substituted by substituents independently selected from the group consisting of OH, O, N and halogen (F, Cl, Br, I),

C_3-C_{20} aryl which is unsubstituted or substituted by substituents independently selected from the group consisting of C_1-C_6 alkyl, C_1-C_6 alkoxy, C_1-C_6 haloalkyl, cyano, nitro, OH, O, N and halogen, or

C_4-C_{20} aryl-alkyl which is unsubstituted or substituted in the aryl moiety by substituents independently selected from the group consisting of C_1-C_6 alkyl, C_1-C_6 alkoxy, C_1-C_6 haloalkyl, cyano, nitro, OH, O, N and halogen;

R^{31} is 2,3-dihydro-6-hydroxyindene; sesamol; catechol monoester; $-CH_2-C(O)-N(R^7)_2$ wherein each R^7 is hydrogen or C_{1-4} alkyl and is the same or different; $-CH_2-S(O)(R^7)$; $-CH_2-S(O)_2(R^7)$; $-O-CH_2-CH(OC(O)CH_2R^7)-CH_2(OC(O)CH_2R^7)$; cholesteryl; a monosaccharide; a disaccharide; an oligosaccharide (3 to 9 monosaccharide residues), enolpyruvate; glycerol; an α-D-β-diglyceride; trimethoxybenzyl; triethoxybenzyl; 2-alkyl pyridinyl (C_{1-4} alkyl);



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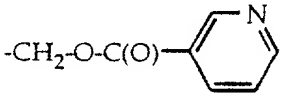

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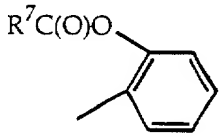
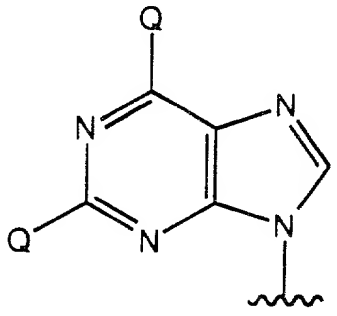
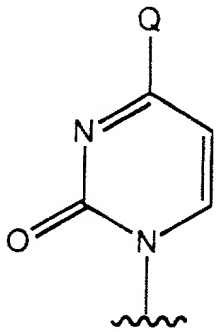


;

C_3-C_6 aryl substituted by 3, 4 or 5 halogen atoms or 1 or 2 atoms or groups selected from halogen, C_1-C_{12} alkoxy, cyano, nitro, OH, C_1-C_{12} haloalkyl, C_1-C_{12} alkyl, C_2-C_{12} alkenyl or C_2-C_{12} alkynyl; or

C_1-C_4 alkylene-C_3-C_6 aryl substituted in the aryl moiety by 3 to 5 halogen atoms or 1 to 2 atoms or groups selected from halogen, C_1-C_{12} alkoxy, cyano, nitro, OH, C_1-C_{12} haloalkyl, C_1-C_{12} alkyl, C_2-C_{12} alkenyl or C_2-C_{12} alkynyl, provided that when Z^1 is $-CH_2-O-CH_2-CH_2-$ and B is adenin-9-yl, both R^{31} are not 4-nitrobenzyl or 4-trifluoromethyl-benzyl, and provided that when Z^1 is $-CH_2-O-CH_2-CH_2-$, $-CH_2-O-C\#H(CH_2OH)-CH_2-$, $-CH_2-O-C\#H(CH_3)-CH_2-$, $-CH_2-O-C\#H(CH_2F)-CH_2-$ or $-CH_2-O-C\#H(CH=CH_2)-CH_2-$ and B is adenine, cytosine, guanine, thymine, uracil, 2,6-diamino purine, hypoxanthine, or Z^2; wherein Z^2 is



or


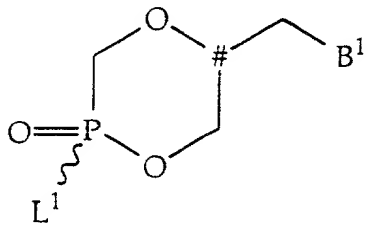
Q is independently chosen from H, Cl, NHR^X, NR^X_2, $NHC(O)R^X$, $N(C(O)R^X)_2$, OH or $NCHN(R^X)_2$, then L^1 is not OR^Y, NH_2, NHR^X, or $N(R^X)_2$ where R^Y represents a physiologically hydrolyzable ester group selected from the group consisting of $CH_2C(O)N(R^X)_2$, $CH_2C(O)OR^X$, $CH_2OC(O)R^X$, $CH(R^X)OC(O)R^X$, $CH_2C(R^X)_2CH_2OH$, or CH_2OR^X; R^Y may also be R^X provided that R^Y and R^X are not simultaneously alkyl;

R^X represents C_1-C_{20} alkyl, aryl or aryl-alkyl which may be substituted or unsubstituted by substituents independently selected from the group consisting of hydroxy, oxygen, nitrogen and halogen.

18. The compound of claim 17 wherein R^{31} is 2-methoxyphenyl, 3-methoxyphenyl, 4-methoxyphenyl, 2-fluorophenyl, 3-fluorophenyl, 4-fluorophenyl, 2-ethoxy-5-hydroxyphenyl, 2-ethoxy-4-hydroxyphenyl 3,5-dimethoxyphenyl, 2,4-difluorophenyl, 2-(haloalkyl)-phenyl, 3-(haloalkyl)phenyl, 4-(haloalkyl)-phenyl, 2-cyanophenyl, 3-cyanophenyl, 4-cyanophenyl, 2-ethoxyphenyl, 2-carboethoxyphenyl, 3-carboethoxyphenyl, 4-carboethoxyphenyl, or 2-haloalkylbenzyl, 3-haloalkylbenzyl or 4-haloalkylbenzyl.

19. The compound of claim 18 wherein B is cytosin-1-yl, 6-azacytosin-1-yl, 5-fluorocytosin-1-yl, adenin-9-yl, guanin-9-yl or 2, 6-diaminopurin-9-yl.

20. A compound of the formula $(L^1)_2P(O)$-Z-B^1 or



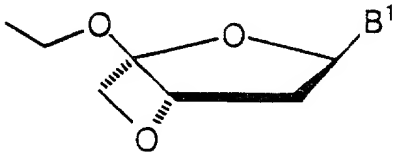
wherein

substituents linked to the carbon atom designated # are in the *R*, *S* or *RS* configuration;

L^1 is independently an amino acid, a polypeptide, an oxyester, a thioester or a substituted or unsubstituted amine;

B^1 is a protected heterocyclic base; and

$Z\text{-}B^1$ is



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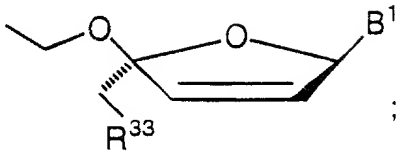

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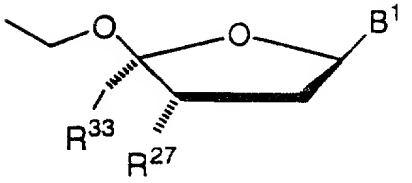

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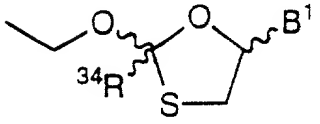

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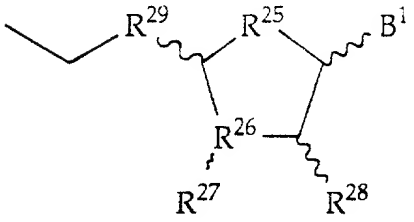
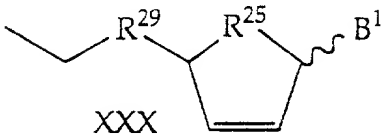


; or


wherein

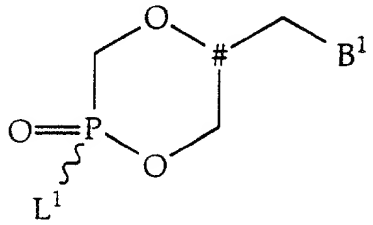
R^{27} is H, OH, halogen, N_3, C_1-C_4 alkyl, C_1-C_4 alkoxy or when, R^{26} is S, R^{27} is absent;

R^{28} is H, OH, halogen, N_3, C_1-C_4 alkyl or C_1-C_4 alkoxy;

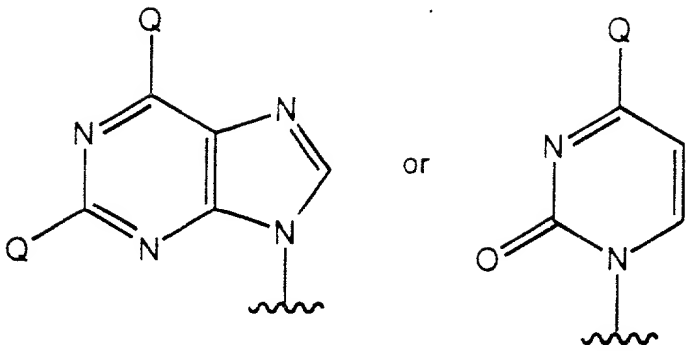
R^{29} is O, S, CH_2, CHF or CF_2;

R^{33} is H, OH, TBSO, halogen, cyano, CH_2N_3, C_1-C_4 alkyl, C_1-C_4 alkoxy, CH_2OH or azido; and

R^{34} is H, CH_2CN or CF_3, with the proviso that, for structure XXX, when R^{25} is O or CH_2 and R^{29} CH_2 or O, L^1 is not H or C_1-C_6 alkyl, provided that for compounds of structure



when B^1 is

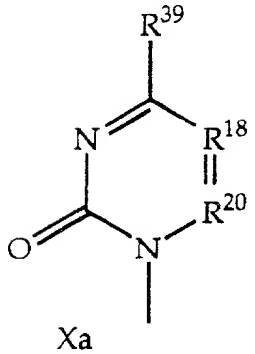


wherein Q is independently chosen from H, Cl, NHR^X, NR^X_2, $NHC(O)R^X$, $N(C(O)R^X)_2$, OH or $NCHN(R^X)_2$, then L^1 is not OR^Y, NH_2, NHR^X, or $N(R^X)_2$ where R^Y represents a physiologically hydrolyzable ester group selected from the group consisting of $CH_2C(O)N(R^X)_2$, $CH_2C(O)OR^X$, $CH_2OC(O)R^X$, $CH(R^X)OC(O)R^X$, $CH_2C(R^X)_2CH_2OH$, or CH_2OR^X; R^Y may also be R^X provided that R^Y and R^X are not simultaneously alkyl;

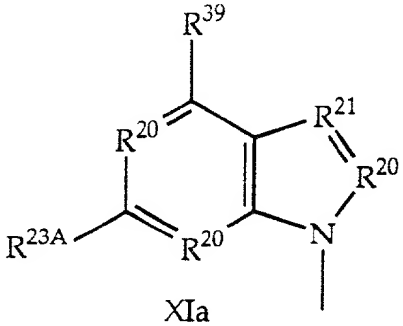
R^X represents C_1-C_{20} alkyl, aryl or aryl-alkyl which may be substituted or unsubstituted by substituents independently selected from the group consisting of hydroxy, oxygen, nitrogen and halogen;

provided that when R^{25} is O, R^{29} is CH_2, R^{26} is CH, R^{27} is OH, R^{28} is H or F, and B is adenine, thymine, guanine, cytosine or protected adenine, protected guanine or protected cytosine, both L^1 are not H, methyl or phenyl.

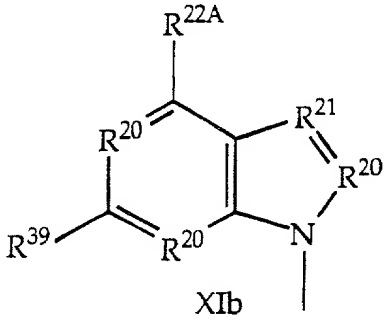
21. The compound of claim 20 wherein B^1 is



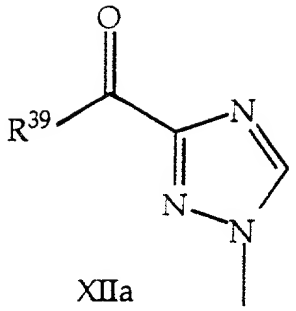
Xa



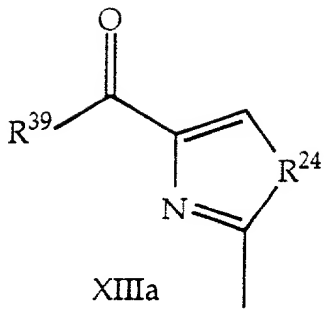
XIa



XIb



XIIa



XIIIa

wherein

R^{18} is N, CF, CCl, CBr, CI, CR^{19} or CSR^{19}, COR^{19};

R^{20} is N or CH;

R^{21} is N, CH, CCN, CCF_3, CC≡CH or $CC(O)NH_2$;

R^{22A} is R^{39} or R^{22} provided that R^{22} is not NH_2;

R^{22} is H, OH, NH_2, SH, SCH_3, SCH_2CH_3, SCH_2CCH, SCH_2CHCH_2, SC_3H_7, $NH(CH_3)$, $N(CH_3)_2$, $NH(CH_2CH_3)$, $N(CH_2CH_3)_2$, $NH(CH_2CCH)$, $NH(CH_2CHCH_2)$, $NH(C_3H_7)$ or halogen (F, Cl, Br or I);

R^{23A} is R^{39} or R^{23} provided that R^{23} is not NH_2;

R^{23} is H, OH, F, Cl, Br, I, SCH_3, SCH_2CH_3, SCH_2CCH, SCH_2CHCH_2, SC_3H_7, OR^{16}, NH_2, or NHR^{17};

R^{24} is O, S or Se; and

R^{39} is NHR^{40}, $NHC(O)R^{36}$ or $NCR^{41}N(R^{38})_2$ wherein,

R^{36} is C_1-C_{19} alkyl, C_1-C_{19} alkenyl, C_3-C_{10} aryl, adamantoyl, alkylanyl, or C_3-C_{10} aryl substituted with 1 or 2 atoms or groups selected from halogen, methyl, ethyl, methoxy, ethoxy, hydroxy and cyano;

R^{38} is C_1-C_{10} alkyl, or both R^{38} together are 1-morpholino, 1-piperidine or 1-pyrrolidine;

R^{40} is $C_{1\text{-}20}$ alkyl; and

R^{41} is hydrogen or CH_3.

22. The compound of claim 21 wherein L^1 is R or R^{31} wherein

R is

C_3-C_{24} 1-acyloxy-1-alkyl,

C_6-C_{24} 1-acyloxy-1-aryl-1-alkyl,

C_3-C_{24} 1-acyloxy-2-alkoxy-1-alkyl,

C_3-C_{24} 1-acyloxy-2-halo-1-alkyl,

C_1-C_{20} alkyl which is unsubstituted or substituted by substituents independently selected from the group consisting of OH, O, N and halogen (F, Cl, Br, I),

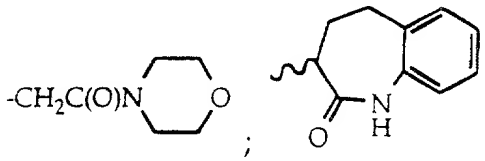
C_3-C_{20} aryl which is unsubstituted or substituted by substituents independently selected from the group consisting of C_1-C_6 alkyl, C_1-C_6 alkoxy, C_1-C_6 haloalkyl (1 to 3 halogen atoms), cyano, nitro, OH, O, N and halogen,

C_4-C_{20} aryl-alkyl which is unsubstituted or substituted in the aryl moiety by substituents independently selected from the group consisting of C_1-C_6 alkyl, C_1-C_6 alkoxy, C_1-C_6 haloalkyl (1 to 3 halogen atoms), cyano, nitro, OH, O, N and halogen,

C_3-C_6 aryl substituted by 3 to 5 halogen atoms or 1 to 2 atoms or groups independently selected from the group consisting of halogen, C_1-C_{12} alkoxy, cyano, nitro, hydroxy, C_1-C_{12} haloalkyl, C_1-C_{12} alkyl, C_2-C_{12} alkenyl or C_2-C_{12} alkynyl, or

C_1-C_4 alkylene-C_3-C_6 aryl substituted in the aryl moiety by 3 to 5 halogen atoms or 1 to 2 atoms or groups independently selected from the group consisting of halogen, C_1-C_{12} alkoxy, cyano, nitro, hydroxy, C_1-C_{12} haloalkyl, C_1-C_{12} alkyl, C_2-C_{12} alkenyl or C_2-C_{12} alkynyl; and

R^{31} is 2,3-dihydro-6-hydroxyindene; sesamol; catechol monoester; $-CH_2-C(O)-N(R^7)_2$ wherein each R^7 the same or different; $-CH_2-S(O)(R^7)$; $-CH_2-S(O)_2(R^7)$; $-O-CH_2-CH(OC(O)CH_2R^7)-CH_2(OC(O)CH_2R^7)$; cholesteryl; a monosaccharide; a disaccharide; an oligosaccharide (3 to 9 monosaccharide residues), enolpyruvate; glycerol; an α-D-β-diglyceride; trimethoxybenzyl; triethoxybenzyl; 2-alkyl pyridinyl (C_{1-4} alkyl);



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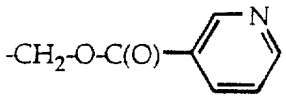

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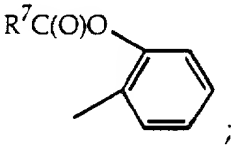


;

C_3-C_6 aryl substituted by 3, 4 or 5 halogen atoms or 1 or 2 atoms or groups selected from halogen, C_1-C_{12} alkoxy, cyano, nitro, OH, C_1-C_{12} haloalkyl, C_1-C_{12} alkyl, C_2-C_{12} alkenyl or C_2-C_{12} alkynyl; or

C_1-C_4 alkylene-C_3-C_6 aryl substituted in the aryl moiety by 3 to 5 halogen atoms or 1 to 2 atoms or groups selected from halogen, C_1-C_{12} alkoxy, cyano, nitro, OH, C_1-C_{12} haloalkyl, C_1-C_{12} alkyl, C_2-C_{12} alkenyl or C_2-C_{12} alkynyl.

23. The compound of claim 21 wherein L^1 is ethylglycine or N-methylglycine.

24. A compound of the formula $(OR^{35})(OR^{35})P(O)$-Z-B, wherein;

B is a heterocyclic base;

R^{35} is independently R or R^{31} , wherein R is independently

H,

C_3-C_{24} 1-acyloxy-1-alkyl,

C_6-C_{24} 1-acyloxy-1-aryl-1-alkyl,

C_3-C_{24} 1-acyloxy-2-alkoxy-1-alkyl,

C_3-C_{24} 1-acyloxy-2-halo-1-alkyl,

C_1-C_{20} alkyl which is unsubstituted or substituted by substituents independently selected from the group consisting of OH, O, N and halogen (F, Cl, Br, I),

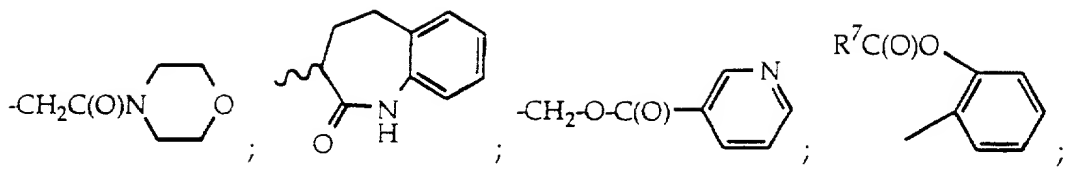
C_3-C_{20} aryl which is unsubstituted or substituted by substituents independently selected from the group consisting of C_1-C_6 alkyl, C_1-C_6 alkoxy, C_1-C_6 haloalkyl (1 to 3 halogen atoms), cyano, nitro, OH, O, N and halogen,

C_4-C_{20} aryl-alkyl which is unsubstituted or substituted in the aryl moiety by substituents independently selected from the group consisting of C_1-C_6 alkyl, C_1-C_6 alkoxy, C_1-C_6 haloalkyl (1 to 3 halogen atoms), cyano, nitro, OH, O, N and halogen,

C_3-C_6 aryl substituted by 3 to 5 halogen atoms or 1 to 2 atoms or groups independently selected from the group consisting of halogen, C_1-C_{12} alkoxy, cyano, nitro, hydroxy, C_1-C_{12} haloalkyl, C_1-C_{12} alkyl, C_2-C_{12} alkenyl or C_2-C_{12} alkynyl, or

C_1-C_4 alkylene-C_3-C_6 aryl substituted in the aryl moiety by 3 to 5 halogen atoms or 1 to 2 atoms or groups independently selected from the group consisting of halogen, C_1-C_{12} alkoxy, cyano, nitro, hydroxy, C_1-C_{12} haloalkyl, C_1-C_{12} alkyl, C_2-C_{12} alkenyl or C_2-C_{12} alkynyl;

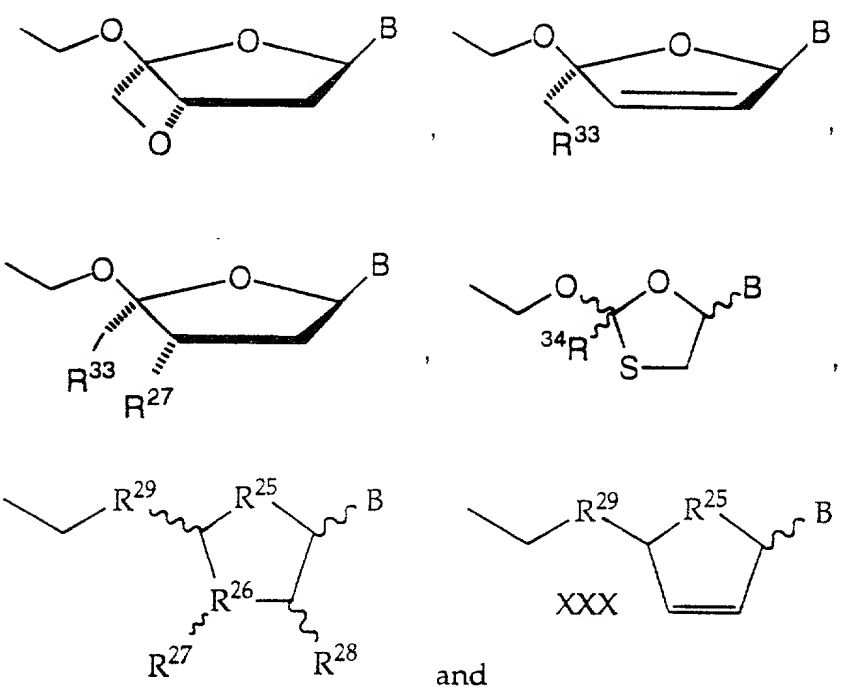
R^{31} is 2,3-dihydro-6-hydroxyindene; sesamol; catechol monoester; $-CH_2$-$C(O)$-$N(R^7)_2$ wherein each R^7 the same or different; $-CH_2$-$S(O)(R^7)$; $-CH_2$-$S(O)_2(R^7)$; -O-CH_2-$CH(OC(O)CH_2R^7)$-$CH_2(OC(O)CH_2R^7)$; cholesteryl; a monosaccharide; a disaccharide; an oligosaccharide (3 to 9 monosaccharide residues), enolpyruvate; glycerol; an α-D-β-diglyceride; trimethoxybenzyl; triethoxybenzyl; 2-alkyl pyridinyl (C_{1-4} alkyl);



C_3-C_6 aryl substituted by 3, 4 or 5 halogen atoms or 1 or 2 atoms or groups selected from halogen, C_1-C_{12} alkoxy, cyano, nitro, OH, C_1-C_{12} haloalkyl, C_1-C_{12} alkyl, C_2-C_{12} alkenyl or C_2-C_{12} alkynyl; or

C_1-C_4 alkylene-C_3-C_6 aryl substituted in the aryl moiety by 3 to 5 halogen atoms or 1 to 2 atoms or groups selected from halogen, C_1-C_{12} alkoxy, cyano, nitro, OH, C_1-C_{12} haloalkyl, C_1-C_{12} alkyl, C_2-C_{12} alkenyl or C_2-C_{12} alkynyl;

Z-B is selected from the group consisting of



and

wherein

substituents linked to the carbon atom designated # are in the *R*, *S* or *RS* configuration,

R^{25} is CH_2, CHF or O;

R^{26} is CH or S, provided that when R^{25} is CH, R^{26} is not S;

R^{27} is H, OH, halogen, N_3, C_1-C_4 alkyl, C_1-C_4 alkoxy or when, R^{26} is S, R^{27} is absent;

R^{28} is H, OH, halogen, N_3, C_1-C_4 alkyl or C_1-C_4 alkoxy;

R^{29} is O, S, CH_2, CHF or CF_2;

R^{33} is H, OH, TBSO, halogen, cyano, CH_2N_3, C_1-C_4 alkyl, C_1-C_4 alkoxy, CH_2OH or azido; and

R^{34} is H, CH_2CN or CF_3, with the proviso that, for structure XXX, when R^{25} is O or CH_2 and R^{29} CH_2 or O, R^{35} is not H or C_1-C_6 alkyl; and

provided that when R^{25} is CH_2, R^{29} is CH_2, R^{26} is CH, R^{27} is H, R^{28} is H, and B is adenine, R^{35} are not both H or C_3H_7; and

provided that when R^{25} is O, R^{29} is CH_2, R^{26} is S, R^{28} is H, and B is cytosine or protected cytosine, R^{35} are not both H or ethyl; and

provided that when R^{25} is CH_2, R^{29} is O, R^{26} is CH, R^{27} is H, R^{28} is H, and B is adenine, guanine, hypoxanthine, cytosine, uracil or thymine, R^{35} are not both H or C_3H_7; and

provided that when R^{25} is O, R^{29} is CH_2, R^{26} is CH, R^{27} is N_3, R^{28} is H, and B is thymine, R^{35} is not H or phenyl; and

provided that when R^{25} is CH_2, R^{29} is O, R^{26} is CH, R^{27} is H, R^{28} is H, and B is thymine, R^{35} is not H or C_1-C_6 alkyl; and

provided that when R^{25} is O, R^{29} is CH_2, R^{26} is CH, R^{27} is OH, R^{28} is H or F, and B is adenine, thymine, guanine, cytosine or protected adenine, protected guanine or protected cytosine, both R^{35} are not H, methyl or phenyl; and

provided that when R^{25} is O, R^{29} is O, R^{26} is CH, R^{27} is H, OH or C_1-C_4 alkyl, R^{28} is H, OH or C_1-C_4 alkyl, and B is xanthine, substituted xanthine, guanine, substituted guanine, purine, substituted purine, cytosine, substituted cytosine, thymine, uracil, substituted uracil, adenine or substituted adenine, R^{35} is not H or C_1-C_6 alkyl.

25. The compound of claim 24 wherein R^{35} is independently phenyl, benzyl, adamantoyl oxymethyl, pivaloyloxymethyl, 2-methoxyphenyl, 3-methoxyphenyl, 4-methoxyphenyl, 2-fluorophenyl, 3-fluorophenyl, 4-fluorophenyl, 2-ethoxy-5-hydroxyphenyl, 2-ethoxy-4-hydroxyphenyl 3,5-dimethoxyphenyl, 2,4-difluorophenyl, 2-(haloalkyl)-phenyl, 3-(haloalkyl)phenyl, 4-(haloalkyl)-phenyl, 2-cyanophenyl, 3-cyanophenyl, 4-cyanophenyl, 2-ethoxyphenyl, 2-carboethoxyphenyl, 3-carboethoxyphenyl, 4-carboethoxyphenyl, or 2-haloalkylbenzyl, 3-haloalkylbenzyl or 4-haloalkylbenzyl.

26. The compound of claim 25 wherein B^1 is N^4-benzoylcytosin-1-yl, N^4-(6-aminohexyl)cytosin-1-yl, N^4-(10-aminodecyl)cytosin-1-yl, N^4-(14-aminolauryl)cytosin-1-yl.

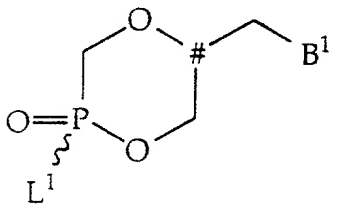
27. The compound of claim 1 where L^1 or L^2 is an immunogenic peptide or protein.

28. An antibody capable of binding specifically to a compound of claim 27.

29. A compound of claim 2 for oral administeration of an antivirally-effective dose to a subject.

30. The compound of claim 29 wherein the compound is enriched or resolved at the phosphate atom chiral center.

31. A compound of claim 20 having the structure



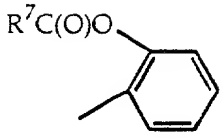
for oral administeration of antivirally-effective dose to a subject.

32. The compound of claim 31 wherein the compound is enriched or resolved at the phosphate atom chiral center.

33. A compound of formula I, wherein the compound is labeled with a detectable moiety selected from the group of an enzyme, radioisotope, stable free radical, fluorophor, and a chemiluminescent group.

34. A compound of the formula $(R^{31}O)_2P(O)\text{-}CH_2\text{-}OH$ or $(R^{31}O)_2P(OSi(CH_3)_3)$ wherein

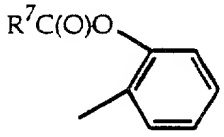
R^{31} is trimethoxybenzyl; triethoxybenzyl; 2-alkyl pyridinyl ($C_{1\text{-}4}$ alkyl);



wherein R^7 is hydrogen or C_{1-4} alkyl; or

C_3-C_6 aryl substituted by 3, 4 or 5 halogen atoms or 1 or 2 atoms or groups selected from halogen, C_1-C_{12} alkoxy, cyano, nitro, C_1-C_{12} haloalkyl, C_1-C_{12} alkyl or C2-12 alkynyl, provided that for compound $(R^{31}O)_2P(O)$-CH_2-OH, R^{31} is not phenyl.

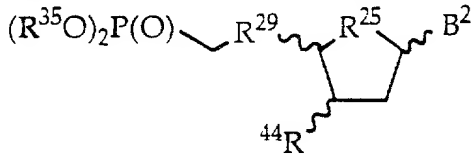
35. A method to synthesize a compound of structure $(R^{31}O)_2P(O)$-CH_2-OH comprising silylating a compound of structure $(R^{31}O)_2P(O)H$ with about 1 equivalent of bis(trimethylsilyl)trifluoroacetamide, drying the resulting compound and reacting the resulting compound with paraformaldehyde containing catalytic amounts of a lewis acid, wherein R^{31} is trimethoxybenzyl; triethoxybenzyl; 2-alkyl pyridinyl (C_{1-4} alkyl);



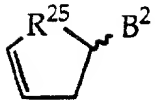
wherein R^7 is hydrogen or C_{1-4} alkyl;

C_3-C_6 aryl substituted by 3, 4 or 5 halogen atoms or 1 or 2 atoms or groups selected from halogen, C_1-C_{12} alkoxy, cyano, nitro, C_1-C_{12} haloalkyl, C_1-C_{12} alkyl or C2-12 alkynyl.

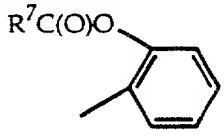
36. A method to synthesize a compound of structure



by reacting a compound of structure



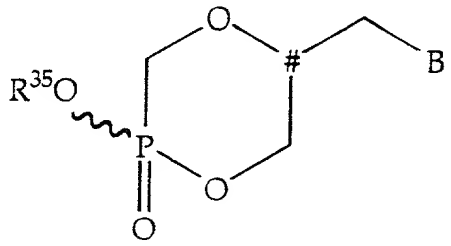
with iodine and $(R^{31}O)_2P(O)$-CH_2-OH at high temperature, wherein B^2 is a heterocyclic base or a protected heterocyclic base; R^{31} is trimethoxybenzyl; triethoxybenzyl; 2-alkyl pyridinyl (C_{1-4} alkyl);



wherein R^7 is hydrogen or C_{1-4} alkyl;

C_3-C_6 aryl substituted by 3, 4 or 5 halogen atoms or 1 or 2 atoms or groups selected from halogen, C_1-C_{12} alkoxy, cyano, nitro, C_1-C_{12} haloalkyl, C_1-C_{12} alkyl or C2-12 alkynyl; and R^{44} is iodine or fluorine.

37. A compound having the formula



and stereoisomers and salts of such compounds wherein

B is a purine or pyrimidine base;

R^{35} is R or R^{31};

R is 2-alkoxyphenyl , 3-alkoxyphenyl, 4-alkoxyphenyl (C_1-C_{12} alkyl), 2-halophenyl, 3-halophenyl, 4-halophenyl, 2,3-dihalophenyl, 2,4-dihalophenyl, 2,5-dihalophenyl, 2,6-dihalophenyl, 3,4-dihalophenyl, 3,5-dihalophenyl, 4-haloalkylphenyl (1-5 halogens, C_1-C_{12} alkyl), carboalkoxyphenyl (C_1-C_4 alkyl), 2-haloalkylbenzyl, 3-haloalkylbenzyl, 4-haloalkylbenzyl (1 to 5 halogen atoms, C_1-C_{12} alkyl), alkylsalicylphenyl (C_1-C_4 alkyl), alkoxy ethyl (C_1-C_6 alkyl), aryloxy ethyl (C_6-C_9 aryl optionally substituted by OH, NH_2, halo, C_1-C_4 alkyl or C_1-C_4 alkyl substituted by OH or by 1 to 3 halo atoms), 2-pyrrolyl, 3-pyrrolyl, 2-thienyl, 3-thienyl, 2-imidazolyl, 4-imidazolyl, 2-oxazolyl, 4-oxazolyl, 5-oxazolyl, 3-isoxazolyl, 4-isoxazolyl, 2-thiazolyl, 4-thiazolyl, 5-thiazolyl, 3-isothiazolyl, 4-isothiazolyl, 5-isothiazolyl, 3-pyrazolyl, 4-pyrazolyl, 2-pyridinyl, 3-pyridinyl, 4-pyridinyl, 2-pyrimidinyl, 4-pyrimidinyl, 5-pyrimidinyl, 2-methoxyphenyl, 3-methoxyphenyl, 4-methoxyphenyl, 2-ethoxyphenyl, 3-ethoxyphenyl, 4-ethoxyphenyl, 2-fluorophenyl, 3-fluorophenyl, 4-fluorophenyl, 2,4-difluorophenyl, 2,4-dichlorophenyl, 2-trifluoromethylphenyl, 3-trifluoromethylphenyl, 4-trifluoromethylphenyl, 2-trichloromethylphenyl, 3-trichloromethylphenyl, 4-trichloromethylphenyl, 2-cyanophenyl, 3-cyanophenyl, 4-cyanophenyl, 2-carboethoxyphenyl, 3-carboethoxyphenyl, 4-carboethoxyphenyl (-C_6H_4-C(O)-OC_2H_5), 2,3-dicarboethoxyphenyl, 2,4-dicarboethoxyphenyl, 2,5-dicarboethoxyphenyl, 2,6-dicarboethoxyphenyl, 3,4-dicarboethoxyphenyl, 3,5-dicarboethoxyphenyl, 1-pyridinyl, 2-pyridinyl, 3-pyridinyl, 4-pyridinyl (-C_5H_4N), 2-nitrophenyl, 3-

nitrophenyl, 4-nitrophenyl, 4-trifluoromethylbenzyl, 2-ethylsalicylphenyl, 3-ethylsalicylphenyl, 4-ethylsalicylphenyl, 2-acetylphenyl, 3-acetylphenyl, 4-acetylphenyl, 1,8-dihydroxy-naphthyl (-O-$C_{10}H_6$-OH or -O-$C_{10}H_6$-O-), 2,2'-dihydroxybiphenyl (-O-C_6H_4-C_6H_4-O-), methoxy ethyl (-CH_2-CH_2-O-CH_3), phenoxymethyl, phenoxy ethyl , -C_6H_4-CH_2-N(CH_3)2 or N-ethylmorpholino -(CH_2)2-N[(CH_2)2(CH_2)2]O);

R^{31} is 2,3-dihydro-6-hydroxyindene, sesamol, catechol monoester, -CH_2-C(O)-N(R^7)2 wherein each R^7 is the same or different, -CH_2-S(O)(R^7), -CH_2-S(O)2(R^7), -O-CH_2-CH(OC(O)CH_2R^7)-CH_2(OC(O)CH_2R^7), cholesteryl, enolpyruvate, glycerol, an α-D-β-diglyceride, trimethoxybenzyl, triethoxybenzyl or 2-alkyl pyridinyl (C_{1-4} alkyl);

R^7 is H or C_1-C_4 alkyl; and

the carbon atom designated # has linked substituents that are in the *R*, *S* or *RS* configuration.

38. The compound of claim 37 wherein R^{35} is R.

39. The compound of claim 37 wherein R is 2-alkoxyphenyl , 3-alkoxyphenyl, 4-alkoxyphenyl (C_1-C_{12} alkyl), 2-halophenyl, 3-halophenyl, 4-halophenyl, 2,3-dihalophenyl, 2,4-dihalophenyl, 2,5-dihalophenyl, 2,6-dihalophenyl, 3,4-dihalophenyl, 3,5-dihalophenyl, 4-haloalkylphenyl (1-5 halogens, C_1-C_{12} alkyl), carboalkoxyphenyl (C_1-C_4 alkyl), 2-haloalkylbenzyl, 3-haloalkylbenzyl, 4-haloalkylbenzyl (1 to 5 halogen atoms, C_1-C_{12} alkyl), alkylsalicylphenyl (C_1-C_4 alkyl), alkoxy ethyl (C_1-C_6 alkyl) or aryloxy ethyl (C_6-C_9 aryl optionally substituted by OH, NH_2, halo, C_1-C_4 alkyl or C_1-C_4 alkyl substituted by OH or by 1 to 3 halo atoms).

40. The compound of claim 39 wherein B is cytosine, 5-fluorocytosine, 5-methylcytosine, adenine, guanine, 2,6-diaminopurine, 2-aminopurine, hypoxanthine or thymine.

41. The compound of claim 39 wherein R is alkylsalicylphenyl.

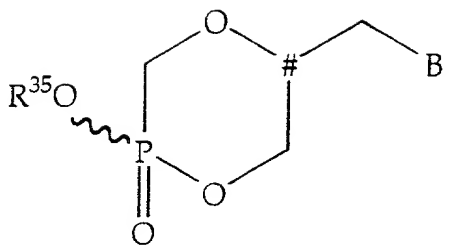
42. The compound of claim 41 wherein B is cytosine.

43. The compound of claim 37 wherein R is 2-pyrrolyl, 3-pyrrolyl, 2-thienyl, 3-thienyl, 2-imidazolyl, 4-imidazolyl, 2-oxazolyl, 4-oxazolyl, 5-oxazolyl, 3-isoxazolyl, 4-isoxazolyl, 2-thiazolyl, 4-thiazolyl, 5-thiazolyl, 3-isothiazolyl, 4-isothiazolyl, 5-isothiazolyl, 3-pyrazolyl, 4-pyrazolyl, 2-pyridinyl, 3-pyridinyl, 4-pyridinyl, 2-pyrimidinyl, 4-pyrimidinyl, 5-pyrimidinyl, 2-methoxyphenyl, 3-methoxyphenyl, 4-methoxyphenyl, 2-ethoxyphenyl, 3-ethoxyphenyl, 4-ethoxyphenyl, 2-fluorophenyl, 3-fluorophenyl, 4-fluorophenyl, 2,4-difluorophenyl, 2,4-dichlorophenyl, 2-trifluoromethylphenyl, 3-trifluoromethylphenyl, 4-trifluoromethylphenyl, 2-trichloromethylphenyl, 3-trichloromethylphenyl, 4-trichloromethylphenyl, 2-cyanophenyl, 3-cyanophenyl, 4-cyanophenyl, 2-carboethoxyphenyl, 3-carboethoxyphenyl, 4-carboethoxyphenyl (-C_6H_4-C(O)-OC_2H_5), 2,3-dicarboethoxyphenyl, 2,4-dicarboethoxyphenyl, 2,5-dicarboethoxyphenyl, 2,6-dicarboethoxyphenyl, 3,4-dicarboethoxyphenyl, 3,5-dicarboethoxyphenyl, 1-pyridinyl, 2-pyridinyl, 3-pyridinyl, 4-pyridinyl (-C_5H_4N), 2-nitrophenyl, 3-nitrophenyl, 4-nitrophenyl, 4-trifluoromethylbenzyl, 2-ethylsalicylphenyl, 3-ethylsalicylphenyl, 4-ethylsalicylphenyl, 2-acetylphenyl, 3-acetylphenyl, 4-acetylphenyl, 1,8-dihydroxy-naphthyl (-O-$C_{10}H_6$-OH or -O-$C_{10}H_6$-O-), 2,2'-dihydroxybiphenyl (-O-C_6H_4-C_6H_4-O-), methoxy ethyl (-CH_2-CH_2-O-CH_3), phenoxymethyl, phenoxy ethyl , -C_6H_4-CH_2-N(CH_3)2 or N-ethylmorpholino (-(CH_2)2-N[(CH_2)2(CH_2)2]O).

44. The compound of claim 43 wherein B is cytosine, 5-fluorocytosine, 5-methylcytosine, adenine, guanine, 2,6-diaminopurine, 2-aminopurine, hypoxanthine or thymine.

45. The compound of claim 37 wherein B is cytosine, 5-fluorocytosine, 5-methylcytosine, adenine, guanine, 2,6-diaminopurine, 2-aminopurine, hypoxanthine or thymine.

46. The use a of compound having the formula



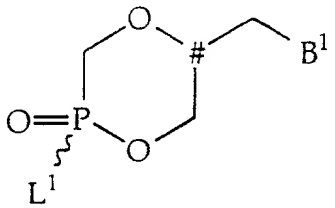
and salts of such compounds wherein the carbon atom designated # has linked substituents that are in the *R*, *S* or *RS* configuration, B is cytosine and R^{35} is alkylsalicylphenyl (C_1-C_4 alkyl) in the preparation of a medicament for treating a viral infection by administering an antivirally-effective dose of the compound to an infected subject.

47. The use of the compound in accordance with claim 46 wherein the compound is enriched or resolved at the phosphate atom chiral center.

48. The use of a compound of claim 2 in the preparation of a medicament for treating a viral infection by administering an antivirally-effective dose of the compound to an infected subject.

49. The use of the compound in accordance with claim 48 wherein the compound is enriched or resolved at the phosphate atom chiral center.

50. The use of a compound of claim 20 having the structure



in the preparation of a medicament for treating a viral infection by administering an antivirally-effective dose of the compound to an infected subject.

51. The use of the compound in accordance with claim 50 wherein the compound is enriched or resolved at the phosphate atom chiral center.